Study provides new understanding of Gurbantunggut Desert's dust source

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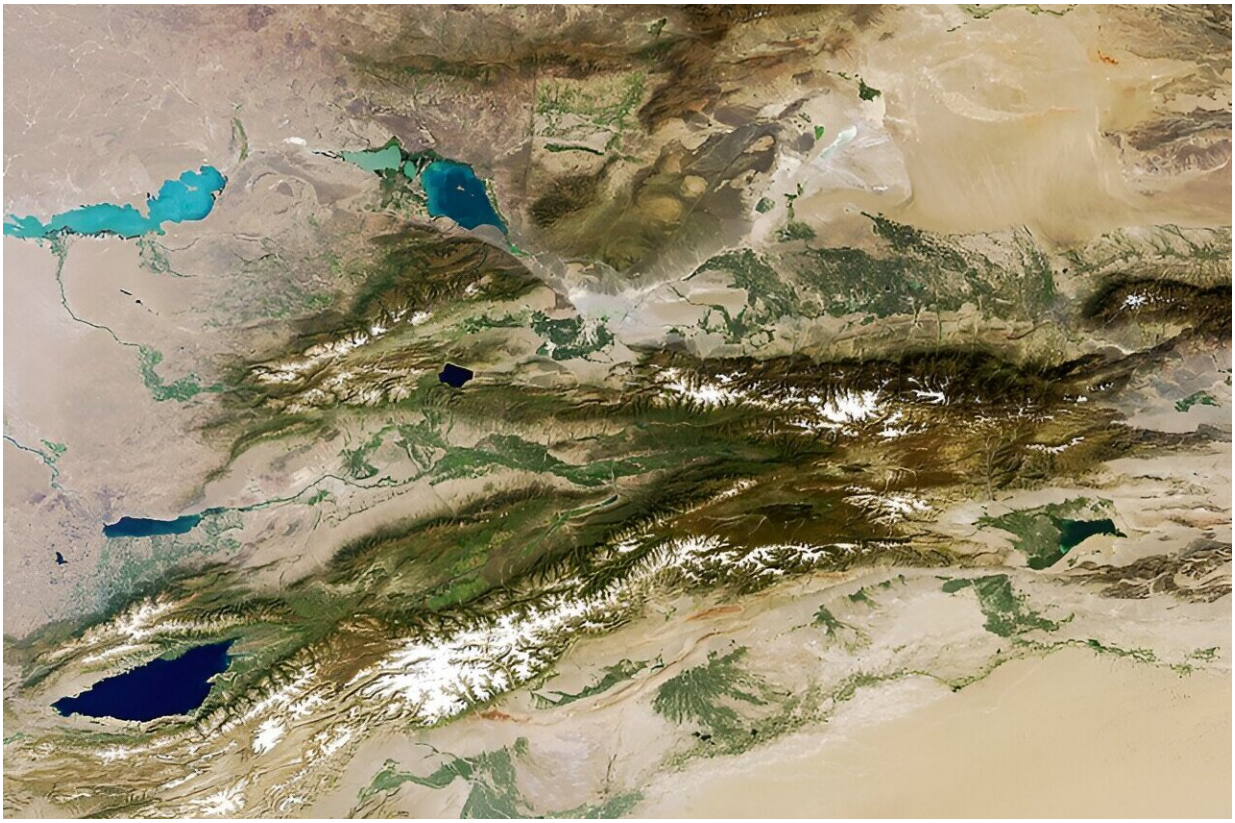

The Tian Shan mountains, stretching across the border region of Kazakhstan, Kyrgyzstan and western China, are pictured in this image. In the upper-right corner are the Dzungarian Basin and its Gurbantunggut Desert in light brown. Credit: Wikimedia Commons/ESA,CC BY-SA 3.0 IGO

Central Asian dust has a significant impact on regional and global

climate, and it is crucial for the balance of local ecosystems, socio-economic development, and human health.

The Gurbantunggut Desert in the northern part of Xinjiang's Junggar Basin is the second largest desert in China, and studying its material sources is important for understanding the dust cycle and long-range dust transport in Central Asia.

Despite extensive research on the sand source of this desert in recent years, the study of the contribution of dust from the Gurbantunggut Desert to the loess in the northern foothills of the Tianshan Mountains and the North Pacific region needs more attention.

Researchers from the Institute of Earth Environment of the Chinese Academy of Sciences (CAS) collected a large number of desert sand samples from the east–west and south–north directions of the Gurbantunggut Desert.

Based on the principal component analysis of geochemical elements and using various research methods such as artificial neural network multilayer perceptron and Metropolis-Hastings resampling, they explored the spatial heterogeneity of the geochemical characteristics of the Gurbantunggut Desert sand and revealed the main material sources of different areas of the desert.

Their results are published in the journal *Global and Planetary Change*.

The researchers clarified the genetic connection between the Gurbantunggut Desert and the loess in the northern Tianshan Mountains and its contribution to the dust in the North Pacific region. The results show that the desert sand in the northern and western parts of the Gurbantunggut Desert comes from the Altai and Junggar Mountains, respectively, and that the Tianshan Mountains do not contribute much to

this desert.

In addition, the Gurbantunggut Desert is not the main material source for the loess sediments in the northern foothills of the Tianshan Mountains, which may be related to the lack of silt quality material produced by the desert itself through abrasion.

The researchers also pointed out that the Gurbantunggut Desert is not the main source area for fine-grained dust material in the North Pacific region.

More information: Yue Li et al, Re-evaluating the origins of sands in the Gurbantunggut Desert and its role as an aeolian dust contributor, *Global and Planetary Change* (2024). DOI: 10.1016/j.gloplacha.2024.104482

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